SEASONAL PRICE VARIATION AND TRENDS OF LEMON IN DINDIGUL MARKET

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Abstract
In the analysis of lemon price, the annual average price per tonne has increased at the rate of ₹ 984.23 per annum. The indices of cyclical variation reached the maximum in 1994-95 and 1995-96 and it started declining until 2001-02 and again it started increasing and got stabilized in 2005-06. The price again started decreasing from 1998-99 onwards until 1999-2000 and then it got improved. The co – efficient of variation of irregular variation is 37.68 per cent. The irregular variation in price of Lemon may be due to sudden changes in demand, influenced by the changes in taste and buying behaviour, the price of substitutes, change in relative income level and the like. The seasonal indices-lower price prevailed during July, August, November, December, January and February. This is due to heavy arrivals and post harvest glut in the market. The lower prices imply that growers sold their produce after storing them for some time. The highest price index during April and May was due to the seasonal shrinkage of arrivals and the pre-harvest.

Key Words: Lemon Price Analysis, Secular Trend, Cyclical Variation, Irregular Variation, Temporal Variation, Regression, Moving Average.

Introduction
A large variety of fruits are grown in India, and among them mango, banana, citrus, guava, grape, pineapple and apple had been the major ones. Fruits and vegetables are rich sources of vitamins, minerals, proteins and carbohydrates, which are essential for human nutrition. India produced 40 per cent of the tropical fruits, against Asia's production of 90 per cent. The Total production and area of fruits had been estimated at 43.1 Million Tonnes and 4.01 Million Hectares respectively, which had accounted for 10 per cent of the Total world's production of fruits which was Second only to that of Brazil. According to a report of the World Health Organisation (WHO) the low fruit intake had been estimated to cause about 31 per cent of the number of heart diseases and of 11 per cent of stroke in the World. Citrus is the world's leading tree – fruit crop. Citrus occupies about 9 per cent of the total land under various fruits in India. The most important commercial citrus in India is the mandarin orange followed by the sweet oranges and acid limes.

Statement of Problem
Lemon being an exportable commodity, the price always depends on the national and international demand and supply position. As production and supply of Lemon in the national market are widely fluctuating depending upon the crop situation in different producing states, national prices of Lemon have always fluctuated, which are reflected in the Local prices also. Like other agricultural commodities, prices of Lemon too have year – wise variations. Hence, an attempt has been made to analyse the variations in the price of Lemon.

Review of Literature
Bober in his study entitled "*The Economics of Cycles and Growth*" defined cyclical variation as the recurrent fluctuations that occur at about the same time in many economic time series and has a periodicity that varies from a minimum of one year to a maximum of twelve years. The cyclical variation refers to recurrent up-and-down movements around secular trend levels, which are different from seasonal fluctuations and have duration anywhere from 2 to 12 years. On examining a series of fluctuations that had duration of less than one year and if these fluctuations recurred from year to year in a periodic fashion, it would be inferred that the data were undergoing seasonal variation.

Paris and Paris in their study entitled "*Seasonal Price Variations and Trends for Major Food Crops in Philippines*", observed that the seasonal pattern of price fluctuations are more or less regular within the year.

According to Gupta and Gupta, irregular or random variations refer to such variations which would not repeat in a definite pattern and they include all types of variations other than those accounting for the trend, seasonal and cyclical movements.

Objectives
The main objective of the study is to analyse the variations in the price of Lemon in Dindigul District of Tamilnadu.

Methodology
Dindigul is the major market for both domestic and export trade of Lemon in India. Moreover, this market has got the advantage of being well connected by all means of transportation namely road, railway, sea and air. The price effect in

Dindigul market will be reflected in all other markets. Therefore Dindigul market was selected to study the temporal price variation of Lemon for the period from 1992-93 to 2011-12.

The Analytical Framework
Time series analysis was carried out to study the behaviour of prices of Lemon over a period of time. A Multiplicative Model[2] of the following type has been used.

$$Y = T \times C \times I$$

Where,

Y = Actual Price in Rupees Per tonne
T = Secular Trend
C = Cyclical Variation
I = Irregular Variation

In the present study, due to non-availability of yearly average price statistics over a period of years, the components were decomposed into three categories namely, secular trend, cyclical variation and irregular variation.

Secular Trend
The secular trend is the basic tendency of prices to increase or decrease over a period of time. It describes the pattern of behaviour which has characterized the series in the past. In the present study, the trend of time series of price was worked out, with linear regression equation, since the prices exhibited linear relationship with time. A trend equation fitted for the price of Lemon is.

$$Y = a + bt$$

Where,

Y = Price of Lemon in rupees per tonne
a = Constant
b = Regression co – efficient
t = Time in years.

Cyclical Variation
A careful study of cyclical variation facilitates to face recession period and to reap the benefits during booms. In the present study, the cyclical variation in annual prices of Lemon was studied through moving average method. The steps involved are shown below.
Step 1: Dividing the actual average yearly price by the trend price.
Step 2: Computation of six yearly centered moving average for the detrained data and this formed cyclical variation.

Irregular Variation
It is the irregular movement of prices over a period of time due to random factors. In the present study, Cyclical – Irregular (CI) components were derived by dividing the actual time series with trend element since seasonal element was absent in the annual price series. This Cyclical – Irregular (CI) component was again divided by cyclical Component (C) to estimate the irregular variation.

Results and Discussions
A study on temporal variation of prices would be useful in forecasting the price movements in future. This would in turn help the producer and traders in making effective decision in production and marketing.

The present study analysed the temporal variation of Lemon prices in Dindigul market using yearly average prices of Lemon. Table 1 shows the trend, cyclical and irregular variations of prices of Lemon in the Dindigul market.

Table 1: Trend, Cyclical and Irregular Variations of Prices of Lemon in Dindigul Market

Year	Actual price	Trend	Index of Cyclical	Index of Irregular
1992 – 93	633	-54.29	-	-
1993 – 94	650	100.54	-	-
1994 – 95	708	255.37	-	-
1995 – 96	717	410.20	1.31	1.34
1996 – 97	716	565.03	1.87	0.68
1997 – 98	725	719.86	1.21	0.83
1998 – 99	742	874.69	0.94	0.90
1999 – 00	733	1029.52	0.78	0.92

Research Paper
Impact Factor: 3.853
Peer Reviewed, Listed & Indexed

IJBARR
E- ISSN -2347-856X
ISSN -2348-0653

2000 – 01	750	1184.35	0.67	0.94
2001 – 02	758	1339.18	0.60	0.95
2002 – 03	767	1494.02	0.56	0.92
2003 – 04	808	1648.85	0.56	0.88
2004 – 05	842	1803.68	0.59	0.79
2005 – 06	1217	1958.51	0.66	0.94
2006 – 07	2567	2113.34	0.75	0.99
2007 – 08	1983	2268.17	0.87	1.01
2008 – 09	2433	2423.00	1.01	1.00
2009 – 10	2833	2577.83	-	-
2010 – 11	3500	2732.66	-	-
2011 – 12	4250	2887.49	-	-

Source: FAO-Statistics 2013

Secular Trend
Secular Trend is the basic tendency of prices to increase or decrease over a period of time. The concept does not include short – range oscillations in prices but the study movements over a long time. To identify the trend in prices of Lemon at Dindigul market for the period from 1989 – 90 to 2008 – 09, the linear regression equation was fitted and the estimated trend function was,

$$Y = 5394.41 + 984.23$$
$$R^2 = 0.965$$
$$F = 503.99 \; **$$

Figures in parenthesis denote standard error.
** Significant at one per cent level.

It could be observed from the above function that the co – efficient of determination (R^2) was 0.965 which indicated that 96.5 per cent of variation in the price of Lemon was explained by the dependent variable.

The results also show that there has been a significant increase in the price of Lemon over the years. The annual average price of Lemon per tonne has increased at the rate of ₹ 984.23 per annum. The actual price series with the estimated trend value is presented in Table 2.

Cyclical Variation
Cyclical variation in price of Lemon refers to recurrent up and down movements around secular trend levels which have duration anywhere from 2 to 12 years. These cycles may or may not be periodic. This study is useful in framing suitable policies for stabilizing the price level. The cyclical variation in prices of Lemon is analysed by moving average method. The results are presented in Table 6.12 and the indices of cyclical variations have been plotted in Figure 6.2.

It could be seen from Table 1 that the indices of cyclical variation in the prices of Lemon reached the maximum in 1994-95 and 1995-96 and it started declining until 2001-02 and again it started increasing and got stabilized in 2005-06. The price of Lemon again started decreasing from 1998-99 onwards until 1999-2000 and then it got improved.

Irregular Variation
Irregular variation refers to such variations in price of Lemon which do not repeat themselves in a definite pattern. Irregular variation in price includes all types of variation other than the trend and cyclical movements. Irregular variation in price is caused by certain special isolated occurrences such as sudden change in demand or rapid technological progress. By their nature these movements are irregular and unpredictable. An analysis of irregular variation in price of Lemon in Dindigul market was carried out.

It could be observed from table 1 that once in six or seven years the price of Lemon varied much by irregular factors. The indices of irregular variations for the price of Lemon at Bangalore market ranged from 0.91 to 1.09. The co – efficient of variation of irregular variation is 37.68 per cent. Thus it is inferred from the table that irregular variation in the price of Lemon was seen which was confirmed by the co-efficient of variation of the irregular indices. The irregular variation in price of Lemon may be due to sudden changes in demand, influenced by the changes in taste and buying behaviour, the price of substitutes, change in relative income level and the like.

Seasonal Variation
Seasonal variation in prices of Lemon was observed during the survey period. Lemon is consumed almost daily in a small quantity. There is a regular demand throughout the year. But the supply varied with the production season. Only small

quantities are stored by the growers. This is the cause for the post harvest glut and pre-harvest scarcity. Hence an analysis of the seasonal variation in the price of Lemon is pertinent.

In the present study, the seasonal variations in the monthly average prices of Lemon for ten years from 2002-2011 by applying 12 months average.

Table 2: Seasonal Variation

Month	Seasonal Index
April	164.00
May	162.00
June	123.00
July	96.80
August	96.20
September	107.60
October	144.00
November	53.40
December	51.60
January	50.10
February	48.60
March	101.20

Source: Primary data

Table 2 reveals that much variation in the price of Lemon exists in the market in the different months of a year. It could be observed from the seasonal indices that lower prices prevailed during July, August, November, December, January and February. This is due to heavy arrivals and post harvest glut in the market. The lower prices imply that growers sold their produce after storing them for some time. The highest price index during April and May was due to the seasonal shrinkage of arrivals and the pre-harvest.

Conclusion

The annual average price of Lemon per tonne has increased at the rate of ₹ 984.23 per annum. The indices of cyclical variation in the prices of Lemon reached the maximum in 1994-95 and 1995-96 and it started declining until 2001-02 and again it started increasing and got stabilized in 2005-06. The price of Lemon again started decreasing from 1998-99 onwards until 1999-2000 and then it got improved. The co – efficient of variation of irregular variation is 37.68 per cent. The irregular variation in the price of Lemon was seen which was confirmed by the co-efficient of variation of the irregular indices. It may be due to sudden changes in demand, influenced by the changes in taste and buying behaviour, the price of substitutes, change in relative income level and the like. The seasonal indices that lower prices prevailed during July, August, November, December, January and February. This is due to heavy arrivals and post harvest glut in the market. The lower prices imply that growers sold their produce after storing them for some time. The highest price index during April and May was due to the seasonal shrinkage of arrivals and the pre-harvest.

References
1. Stanley Bober, **The Economics of Cycle and Growth,** Eastern Private Limited, New Delhi, 1971, p-21.
2. Thelma R. Paris and E.C. Paris, "Seasonal Price Variations and Trends for Major Good Crops in Phillipines", **Research Paper**, No.76-80, 1976, p.8.
3. Gupta, S.P., and M.P. Gupta, **Business Statistics**, Sultan Chand and Sons, New Delhi, 1983, p.350.
4. R.N. Chauhan, M. Singh, and D.R. Thakur, "Marketing of Vegetables in Uttar Pradesh", **Indian Journal of Agricultural Marketing,** Vol. XIII, No.2, 1999, p.56.
5. Jain, S.C., **Principles and Practice of Agricultural Marketing and Price Polices**, Vora & Co Publishers Private Limited, Bombay, 1971, p.3.
6. Thomson, F.L., and R.J. Foote, **Agricultural Prices**, the Mc Craw Hill Company, Inc., New Yark, 1952, p.316.
7. Thelma R. Paris and E.C. Paris, "Seasonal Price Variations and Trends for Major Good Crops in Phillipines", **Research Paper**, No.76-80, 1976, p.8.
8. www.tn.govt.in/crop.
9. http//:www.australiancitrusgrowers.com/aspdev/resources/documents/verna9-02.pdf trees.htm.
10. http//9am.ten.com.au/lemon.